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RECORD OF ORAL HEARING

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE BOARD OF PATENT APPEALS
AND INTERFERENCES

Ex parte THORSTEN MAYER, CHRISTIAN WALZ,
and JOHANNES SCHALLER

Appeal 2008-3469
Application 10/534,125
Technology Center 3700

Oral Hearing Held: December 11, 2008

Before JENNIFER D. BAHR, LINDA E. HORNER, and MICHAEL W. O'NEILL, Administrative Patent Judges

ON BEHALF OF THE APPELLANT:

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The above-entitled matter came on for hearing on December 11, 2008, commencing at 9:30 a.m., at the U.S. Patent and Trademark Office, 600 Dulany Street, Alexandria, Virginia, before Janice A. Salas, Notary Public.

PROCEEDINGS

THE CLERK: Calendar number 29, Mr. Gonzales.

JUDGE BAHR: You can start whenever you're ready.

MR. GONZALES: Well, just to refresh your memory, there are 20 claims pending in the application. Claim 29 is a method claim. Stands alone. And claims 11 to 28 and 30 are the claims on appeal. Claims 11 to 30 are the only independent claims on appeal. Claims 11 to 28 are method claims. Claim 30 is the sole apparatus claim on appeal.

With your permission, I'd like to begin the discussion with claim 11, method claim 11, and to properly understand claim 11, I direct your attention to the sole figure of -- drawing in the application.

In the exemplary embodiment, a storage tank 1 contains the urea water solution. The urea water solution can be delivered to an engine exhaust gas line, shown in the drawings by reference numeral 20, by means of a pump through line 11 and a metering device or valve 16.

The apparatus illustrated also includes a line 2 extending from tank 1 through a portion of the urea water solution in tank 1, which make -- through which a portion of the urea water solution in tank 1 may be delivered to a reactor 3.

As a result of heat supplied to the reactor, either by means of an electric heater or by means of the partial flow of exhaust gas from a supply line, a chemical conversion is at use by which ammonia is released from the urea water solution.

Specifically in the specification at page -- paragraph 16, teaches that when heat is supplied to the reactor, the urea in the urea water solution

breaks down into ammonia and carbon dioxide.

When this mixture cools and expands, ammonia gasses out and is transferred into an intermediate reservoir 4 for storage. The ammonia in the reservoir 4 may then be supplied to the exhaust gas by way of the line 10 and the metering device or valve 15, which is opened under the control of the control unit 32.

Specification also teaches that the intermediate reservoir may be formed by a zeolite body or a salt that forms an ammonia complex, which stores ammonia as a function of temperature. At low temperatures the ammonia then is formed and the reactor is stored in the zeolite body or salt and when heat is delivered to the reservoir, the ammonia is released.

Turning now to the language of claim 11, independent claim 11 is directed to a method for post-treatment of exhaust gas of an internal combustion engine, the method comprising, delivering a first auxiliary agent from a supply thereof to the exhaust gas, subjecting a portion of the first auxiliary agent, at least intermittently, to a chemical conversion into a second auxiliary agent, storing the second auxiliary agent in an intermittent reservoir and at least intermittently delivering the second auxiliary agent to the exhaust gas parallel or in alternation with the first auxiliary agent.

Claim 11 stands rejected under 35 U.S.C. 103 as unpatentable over Krutzsch in view of Akama. For the benefit the Board's reporter, Krutzsch is spelled K-R-U-T-Z-S-C-H and Akama is spelled A-K-A-M-A.

Krutzsch also teaches a method and apparatus for the posttreatment of the exhaust gas of an internal combustion engine; however, the method and apparatus taught by Krutzsch is different from that claimed by the claims on appeal.

The method taught by Krutzsch is summarized at column 1 at about lines 39 to 48, and comprises operating the engine in a first operating range with only hydrogen being supplied as a reducing agent for the exhaust gas stream -- upstream of catalyst.

Next, operating the engine in a second operating range with both hydrogen and hydrocarbons being supplied as a reducing agent through the exhaust gas upstream of the catalyst, and operating the engine in a third operating range with only hydrocarbons being supplied as a reducing agent to the exhaust gas upstream of the catalyst.

Now, Krutzsch describes a preferred embodiment beginning at the first full paragraph in column 3, wherein it is disclosed that the HC generator, which he designates 5 in his drawing, may be fuel which is introduced into the exhaust gas directly or through what is called targeted after injection of fuel into the engine combustion chambers.

Likewise, in the second full paragraph of column 3, Krutzsch teaches that the residue of hydrogen in the exhaust gas may be increased by means of an early after injection of fuel. It's made clear in column 4, lines 8 to 11, that these after injections take place directly in the internal combustion engine itself, that is, into the cylinders themselves.

Our understanding what Krutzsch teaches as the preferred embodiment is further reinforced by the summary of the invention found in column 2, lines 13 to 20, where it is stated -- and I read right from the reference.

In the case of engines, which are equipped with a so-called common rail high -- high-pressure injection system, the possibility is particularly advantageous of adjusting a desired proportion of hydrocarbons in the

exhaust gas by a targeted after injection of a given fuel quantity into the internal combustion engine.

In the case of such engines, in addition by means of an early after injection of fuel, it is possible to produce the required hydrogen. In rejecting claim 11, the examiner finds, among other things, that Krutzsch teaches the steps of subjecting a hydrogen producing fluid at least intermittently to a chemical conversion into a second auxiliary agent, namely, hydrogen.

And storing the second auxiliary agent in an intermediate reservoir, which the examiner identifies as being shown in figure 1 or reference numeral 6, making this finding, the examiner points to figure 1 in columns -- column 2, lines 56 to 50 -- I'm sorry -- 56 to 60.

We believe that this is a clear error of fact-finding on the examiner's part, and we would like to emphasize this morning two points.

First, that Krutzsch describes figure 1 in the brief description of drawings as a diagram of an arrangement for carrying out the process. In other words, figure 1 is not intended to be and it's not described as a drawing of any actual apparatus.

Second point is that column 2, lines 56 to 60 do not teach the generation of hydrogen from diesel fuel or from any hydrogen producing fluid and the storing of the hydrogen so produced in an intermediate reservoir.

What Krutzsch actually teaches in column 2, lines 56 to 60 is that -- and I quote from the reference: Any arrangement for generating or storing hydrogen can be used as the hydrogen generator.

I emphasize the use of the word "or." The use of the word "or" is entirely consistent with what is described as a preferred embodiment in

which hydrogen is not stored but produced as needed by the early after injection of fuel directly into the combustion chamber of the engine.

In other words, the hydrogen generator in Krutzsch may simply be a stored supply of hydrogen or the hydrogen can be generated on demand when needed without storage.

As a hydrogen generator, Krutzsch also suggests in column 2, lines 56 to 60 the use of the electrolysis of water, the generating of crack gas or the reforming of methanol, and therefore teaches away from the use of fuel as a source of hydrogen gas except in its preferred embodiment, which fuel is injected directly into the combustion chambers of the engine without any intermediate storage of hydrogen.

Again, in the preferred embodiment, hydrogen is produced directly in the exhaust gas stream. Turning to Akama, Akama teaches an exhaust gas purifying system in which a hydrogen-containing gas, not hydrogen, is introduced into the exhaust gas passageway upstream of a nitrogen oxide absorbing and reducing catalyst.

Akama particularly emphasizes that the temperature of exhaust gas upstream of the nitrogen oxide absorbing and reducing catalyst must not be greater than or higher than 250 degrees centigrade.

The hydrogen-containing gas described in Akama is basically vaporized diesel fuel or light oil, which has been processed in what's called a reforming section having a catalyst containing rubidium, the purpose of which is to reduce the carbon monoxide concentration present in the vaporized fuel.

Thus, Akama does not teach either an apparatus or a method of producing or storing hydrogen gas, but an apparatus and method of

producing and using a hydrogen-containing gas.

I suggest to you that if one of ordinary skill in the art had been looking for an alternative system for generating hydrogen for the system disclosed in Krutzsch, they certainly would not have considered the teachings of Akama or Akama to be relevant because Akama provides no teaching concerning the generation and storage of hydrogen gas.

Instead Akama teaches -- teachings relate only to the generation and storage of a vaporized fuel or a light oil, having a low carbon monoxide concentration.

Furthermore, Akama uses only one agent, namely, a hydrogen-containing gas for the regeneration of a nitrogen oxide absorbing and reducing catalyst and is contrary to the explicit teachings in Krutzsch, which teaches the use of three different substances, specifically, only hydrogen, only hydrogen and a combination of hydrogen and hydroco carbons.

Therefore, a person of ordinary skill in the art of exhaust gas treatment would not have combined the teachings of Krutzsch with the teachings of Akama because the teachings of Akama are actually contrary to the teachings in Krutzsch and actually teaches away from that taught by Krutzsch.

For these reasons, we believe it's inappropriate for the examiner to have combined the teachings of Krutzsch and Akama, and even if one had combined the teachings of Krutzsch and Akama, one of ordinary skill in the art would not have arrived at the method defined by the language of appeal claim 11.

Now, in appellant's main belief, separate arguments are presented regarding several of the claims which are dependent on claim 11, and in the

interest of time, I will not repeat those arguments this morning, but I ask that you consider those arguments that are present in the main brief.

Concerning independent claim 30, which is the only apparatus claim on appeal, claim 30 stands -- also stands rejected under section 103 as unpatentable over Krutzsch in view of Akama. Obviously, our arguments concerning the inappropriateness combining the teachings of Krutzsch and Akama to reject claim 11 also apply to claim 30.

Returning specifically to the specific language of claim 30, which is directed to an apparatus of the posttreatment of exhaust gas on an internal combustion engine, the claim requires a first auxiliary agent kept on hand for the delivery to the exhaust gas, and the embodiment described in appellant's specification and drawings, this is the urea water solution stored tank 1.

Claim 30 also requires a means for at least intermittently subjecting a portion of the first auxiliary agent to a chemical conversion into a second auxiliary agent. In the illustrated embodiment, this is the -- the line 2 and the reactor 3, and the second auxiliary agent is ammonia.

Finally, claim 30 requires an intermediate reservoir for storing the second auxiliary agent so that at least intermittently the second auxiliary agent may be delivered to the exhaust gas parallel to or in alternation with the first auxiliary agent. The intermediate reservoir is shown in appellant's drawings by reference number 4.

We cannot find a clear articulation in the examiner's rejection explaining how claim 30 is being read on the reference.

The examiner seems to concentrate more on the method claim than on the apparatus claim, claim 30, but the examiner seems to rely on Krutzsch for a teaching of diesel fuel stored in a conventional fuel tank for the

claimed first auxiliary agent and the hydrogen generated or stored in the system of Krutzsch as the second auxiliary agent.

What Krutzsch lacks, then, is a teaching of a means for at least intermittently subjecting a portion of the first auxiliary agent to a chemical conversion into a second auxiliary agent and an intermediate reservoir for storing the second auxiliary agent.

Applicants do not believe that Akama solves the deficiencies in the Krutzsch reference. Akama teaches a system in which a single agent, a hydrogen-containing gas, is introduced into the exhaust gas passageway upstream of the catalyst.

The apparatus described includes a storage tank for the diesel fuel by the means of converting the diesel fuel to vapor and a means of reducing carbon monoxide in the vapor fuel and a container for storing the vaporized fuel.

But even if it were obvious to include a storage container for the hydrogen produced by the hydrogen generated in Krutzsch, as the examiner seems to be suggesting, one of ordinary skill would still not have obtained all the structure required by claim 30.

Because of the diesel fuel stored in a conventional fuel tank is the first auxiliary agent in Krutzsch, there's still no teaching in either Krutzsch or Akama of converting diesel fuel into hydrogen and then storing the hydrogen prior to the introduction into the exhaust gas;.

Therefore, even if it had been obvious to combine the teachings of Krutzsch with the teachings of Akama, an issue that we don't concede, one of ordinary skill would still not have arrived at the subject matter defined by claim 30.

That's basically all I have to say this morning. If you have any questions, I'll certainly try to answer them.

JUDGE BAHR: I do have one question. The examiner makes a finding -- if you'll just give me a moment; I want to -- in the answer. I think it's on page 5 of the answer.

Just trying to find the exact language here, but it looks like the examiner makes a finding that urea -- one of the -- the examiner makes the point that there are many different compounds known for reducing NOx emissions in exhaust.

MR. GONZALES: Yes.

JUDGE BAHR: And one of them is urea.

MR. GONZALES: Right.

JUDGE BAHR: Is your client contesting that finding by the examiner that urea and ammonia are well-known reducing agents for reducing NOx emissions?

MR. GONZALES: I don't believe so. In fact, I think one or the -- one of the secondary references -- it's not applied in this rejection, but I think he would acknowledge that it's known to use at least ammonia.

Whether urea water solution is known, I'm not sure. So from that standpoint, I would say he's not conceding that point. He's not conceding that it's -- he's converting.

JUDGE BAHR: But is the finding by the examiner being contested that urea is also well known?

MR. GONZALES: Yes. I would have to say that it is.

JUDGE BAHR: Okay. Could you point me to where that is, if you can find it here.

MR. GONZALES: If I can find it. If it's in the brief, it's there. If it's not, then I would have to say perhaps we're not limiting to our brief because we argued -- this is claim 21? 24?

JUDGE BAHR: It's 21, yeah.

MR. GONZALES: And this is the one where it's Krutzsch in view of Akama in view of design choice.

JUDGE BAHR: Design choice, correct.

(Pause in the proceedings.)

MR. GONZALES: In our brief, we do not concede it. I correct myself. We simply say that the examiner is finding that urea and ammonia are equivalent to hydrocarbons and hydrogen and Krutzsch is speculation. That's on page 16 of our brief.

We go on to cite In Re: Dance and several other cases saying that the suggestion arising from appellant's disclosures is inadmissible as a basis of the rejections, so we are not conceding that in the brief.

JUDGE BAHR: I have no further questions.

JUDGE O'NEILL: I have one question. It goes to the apparatus claim. Are you invoking 112-6 for the means are provided for at least intermittently subjecting a portion of the auxiliary agent into a chemical conversion?

MR. GONZALES: I think -- I think we have. Let me turn to my brief. That's where we discuss the subject matter of the claim, and I do refer to the structure that's shown.

JUDGE O'NEILL: Line 2, reactor 3, line 9?

MR. GONZALES: Correct.

JUDGE O'NEILL: Okay.

MR. GONZALES: Certainly that -- well, it is -- clearly, I'm -- we're relying on it as a means plus function limitation.

Any other questions?

JUDGE BAHR: Nothing.

MR. GONZALES: Thank you very much for your consideration of this.

(Whereupon, the proceedings at 9:53 a.m. were concluded.)